

CLAIMS

1. A printing apparatus having at a printing station, a print head with an array of heating elements individually selectable by a computer controller, a feed path for feeding carrier ribbon through the printing station, the carrier ribbon carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate, by selectively energising the heating elements, as the substrate and print head are relatively moved, the apparatus including a backing member and the substrate being positioned in use between the backing member and the carrier ribbon, and wherein the print head is mounted by a mounting structure for generally linear movement towards and away from the substrate, one of the mounting structure and print head including a projecting part which projects towards the other and at least during printing, engages with the other of the mounting structure and print head, there being a resilient member between the mounting structure and the print head, which allows resiliently resisted movement between the mounting structure and print head with the projecting part engaged with the other of the mounting structure and print head, and there being at least one fastener to couple the mounting structure and print head together.
2. An apparatus according to claim 1 wherein between the print head and mounting structure there is provided a resilient spacer, the spacer having a thickness slightly greater than the extent of projection of the projecting part.
3. An apparatus according to any one of the preceding claims wherein the projecting part is provided on the mounting structure, and at least a tip of the projecting part is hardened to provide a bearing surface.

4. An apparatus according to claim 3 wherein there is a pad of hardened material on the print head.

5. An apparatus according to any one of the preceding claims wherein the printing apparatus is an intermittent printer in which during printing, the print head moves at the printing station and the substrate and carrier are stationary or are moved, and the backing member is stationary during printing.

6. An apparatus according to any one of claims 1 to 4 wherein during printing the print head moves at the printing station and the substrate and carrier are stationary or are moved, and the backing member moves with the print head relative to the substrate and carrier.

7. An apparatus according to any one of claims 1 to 4 wherein the apparatus is a continuous printer in which the print head is stationary at the printing station and the backing member is stationary, whilst the substrate and carrier move past the print head.

8. An apparatus according to any one of the preceding claims wherein the print head is moved at least towards the substrate just prior to printing by a single acting actuator, and the print head moves away from the subject under the action of a spring.

9. An apparatus according to any one of claims 1 to 7 wherein the print head is moved towards the substrate just prior to printing to an in use position, and is moved away from the substrate to a retracted position between printing, by a double acting actuator.

10. An apparatus according to claim 9 wherein the double acting actuator moves the print head in response to control signals from the controller of the printer, and the double acting actuator, in response to a specific control signal from the controller, moves the print head away from the substrate beyond the retracted position.

11. An apparatus according to claim 10 wherein the specific control signal from the controller is generated in response to a signal from a substrate thickness sensor which senses the thickness of the substrate, when the sensor senses that a thick part of the substrate is about to pass through the printing station.

12. An apparatus according to any one of the preceding claims wherein the printing apparatus includes a carrier ribbon supply spool and a carrier ribbon take-up spool, the carrier ribbon feed path being from the supply to the take-up spool through the printing station, each of the take-up and supply spools being driven by a drive motor so that the supply spool and take-up spool are rotated when it is desired to feed ribbon, the motors each being a D.C. servo motor and each of the supply and take-up spool having a rotation sensor to sense spool rotation.

13. An apparatus according to claim 12 wherein to enable the spools to be stopped quickly, the controller of the apparatus provides a reverse voltage to the motors.

14. A printing apparatus having at a printing station, a print head with an array of heating elements individually selectable by a computer controller, a feed path for feeding carrier ribbon through the printing station, the carrier ribbon carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate, by selectively energising the heating elements, as the substrate and print head are relatively moved, the apparatus including a backing member and the substrate being positioned in use between the backing member and the carrier ribbon, and wherein during printing the print head is moved at the printing station along the substrate and carrier, and the backing member is moved with the print head.

15. An apparatus according to claim 14 having any of the features of the printing apparatus of any one of claims 1 to 13.

16. A printing apparatus having at a printing station, a print head with an array of heating elements individually selectable by a computer controller, a feed path for feeding carrier ribbon through the printing station, the carrier ribbon carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate, by selectively energising the heating elements, as the substrate and print head are relatively moved, the apparatus including a backing member and the substrate being positioned in use between the backing member and the carrier ribbon, and wherein the printing apparatus includes a carrier ribbon supply spool and a carrier ribbon take-up spool, the carrier ribbon feed path being from the supply to the take-up spool through the printing station, each of the take-up and supply spools including a drive motor so that the supply spool and take-up spool are rotated when it is desired to feed ribbon.

17. An apparatus according to claim 16 having any of any one of claims 1 to 13.

18. A printing apparatus substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

19. A method of printing utilising a printing apparatus having at a printing station, a print head with an array of heating elements individually selectable by a computer controller, a feed path for feeding carrier ribbon through the printing station, the carrier ribbon carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate, by selectively energising the heating elements, as the substrate and print head are relatively moved, the apparatus including a backing member and the substrate being positioned in use between the backing member and the carrier ribbon, the method including moving the print head prior to printing, towards the substrate to an in use position and after printing, away from the substrate to a retracted position, the method further including sensing the thickness of substrate and when sensing that a thick part of the substrate is about to pass through the printing station, moving the print head away from the substrate beyond the retracted position.

20. A method of printing utilising a printing apparatus having at a printing station, a print head with an array of heating elements individually selectable by a computer controller, a feed path for feeding carrier ribbon through the printing station, the carrier ribbon carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate, by selectively energising the heating elements, as the substrate and print head are relatively moved, the apparatus including a

backing member and the substrate being positioned in use between the backing member and the carrier ribbon, the apparatus further including a carrier ribbon supply spool and a carrier ribbon take-up spool, the carrier ribbon feed path being from the supply to the take-up spool through the printing station, and each of the take-up and supply spools being driven by a D.C. drive motor so that the supply spool and take-up spool are rotated when it is desired to feed ribbon each of the supply and take-up spool including a rotation sensor to sense spool rotation, the method including sensing the rotational position of each spool to provide inputs to the controller, and continuing to move both motors until a desired carrier ribbon movement is achieved.

21. A method according to claim 20 wherein at the end of a print, the motors are reversed to rewind carrier ribbon not used in the previous printing operation so as to be available for printing in a subsequent printing operation.

22. A method of converting a printing apparatus adapted to print in one direction to a printing apparatus adapted to print in an opposite direction, the printing apparatus having at a printing station, a print head with an array of heating elements individually selectable by a computer controller, a feed path for feeding carrier ribbon through the printing station, the carrier ribbon carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate, by selectively energising the heating elements, as the substrate and print head are relatively moved, the apparatus including a backing member and the substrate being positioned in use between the backing member and the carrier ribbon, and the apparatus further including a carrier ribbon supply spool and a carrier ribbon take-up spool, the carrier ribbon feed path being from the supply to the take-up spool through the printing station, and each of the take-up and supply spools being driven by a drive motor so that the supply spool and take-up spool

are rotated when it is desired to feed ribbon, the method including replacing the supply and take-up spools with respectively take-up and supply spools, providing an input to the controller which responds by reversing the directions of rotation of the two spools during printing, whilst maintaining the orientation of the print head with respect to the substrate.

23. A method of printing using the printing apparatus having at a printing station, a print head with an array of heating elements individually selectable by a computer controller, a feed path for feeding carrier ribbon through the printing station, the carrier ribbon carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate, by selectively energising the heating elements, as the substrate and print head are relatively moved, the apparatus including a backing member and the substrate being positioned in use between the backing member and the carrier ribbon, the print head being mounted for movement along the substrate in a direction opposite to the direction the substrate is moved through the printing station, the method including operating the printing apparatus in continuous mode with the print head stationary at the printing station whilst the substrate is moved through the printing station at a speed in excess of a minimum speed necessary for continuous mode printing, sensing the substrate speed, and in the event that the substrate speed slows during printing, moving the print head at the print station along the substrate in a direction opposite to the direction the substrate is moved through the printing station so as to maintain a minimum relative speed between the substrate and print head for the remainder of the print.

24. A method according to claim 23 wherein substrate speed through the printing station is predicted by the controller by providing to the controller data

relating to conditions affecting substrate movement upstream or downstream of the printing apparatus.

25. A method of printing substantially as hereinbefore described with reference to the accompanying drawings.

26. Any novel feature or novel combination of features described herein and/or as shown in the accompanying drawings.